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mobile, and are aggregated about the nucleus. In about twenty-four hours more, however, they become statoliths and fall to the bottom of the cells. During this time the original tip has been losing its starch, and there is a period of from forty-eight to seventy-two hours in which the old tip has lost its starch and the new tip has none in a movable form. During this period the roots are ageotropic.

In ferns the root-tips do not regenerate. Tips cut off transversely just back of the apical cell are unable to organize a new one, though they may continue growing for several weeks. As the statolithic starch is in the root-cap, and this does not regenerate, such roots remain ageotropic.

Besides the discussion of the experiments, a number of chapters are devoted to a discussion of such topics as the influence of external conditions on regeneration, polarity and regeneration, growth and regeneration, purposefulness of regeneration, relation between geotropism and the presence of statocytes, and other interesting topics connected with regeneration.

As the root-tip regenerates from so many kinds of injuries that could never occur in nature Němec considers that at least in the great majority of cases the capacity could not have arisen because of its utility. The immediate stimulus, he thinks, does not lie among nutritive changes, or arise from the wound, but is a phenomenon of correlation, due to the breaking of the connection between the vegetative tip and the root meristem.—W. B. McCALLUM.

Plant histology.

CHAMBERLAIN has revised and rewritten much of his *Methods in plant histology*,⁴ adding several new chapters, elaborating and in many instances shortening the processes. Several new formulae are given for killing and fixing. The paraffin method has been notably improved and the celloidin method has been treated at greater length. A method for embedding in soap is also given.

The new chapters deal with microchemical tests, free-hand sectioning, special methods, the use of the microscope, and micrometric methods involving the use of the camera lucida. A very important new chapter deals with methods of staining filamentous algae and fungi and mounting them in Venetian turpentine. An abstract of the methods of PFEIFFER and WELLHEIM is given, together with such modifications as have been found to give successful preparations. Delicate forms like *Vaucheria* can be carried through the stains and finally mounted in Venetian turpentine without showing the least trace of plasmolysis, and even if slight plasmolysis should occur it can be corrected by manipulation of the mounting medium. Preparations made by this method are exceedingly brilliant and show a wealth of detail not possible with other methods. For example, the two nuclei in zygospores of *Spirogyra* can be readily seen with a low magnification. The Venetian turpentine method, which gives preparations requiring no sealing and as hard and durable as balsam mounts, should almost entirely replace the glycerin method.

⁴ CHAMBERLAIN, CHARLES J., *Methods in plant histology*. pp. x+262. *figs.* 88. Chicago: The University of Chicago Press. 1905. Net \$2.25; postpaid, \$2.39.

Much attention is given to collecting and keeping material alive in the laboratory. KLEBS's method of securing reproductive phases in algae and fungi is presented in a practical manner. Specific directions are given for making such preparations as are needed by teachers and by those who wish to get a comprehensive view of the plant kingdom from the lowest to the highest forms. The book will be useful to those who wish to keep in touch with modern microtechnique.—W. J. G. LAND.

Bibliographical index of North American fungi.

THE compilation of a bibliographical index of North American fungi by FARLOW⁵ is one of the most serviceable tasks ever undertaken in the interests of American systematic mycology, and the publication of it by the Carnegie Institution one of its best contributions to the promotion of botany. The work is the outgrowth of an effort to bring together references to all North American species in the form of a card catalogue. This was begun in 1874, at a time when there was no complete record of the species known from North America. Within a few years of its inception Mr. A. B. SEYMOUR was entrusted with the details of this herculean labor, under Dr. Farlow's direction, and his painstaking fidelity is worthy of recognition.

It is the aim of the work to include all references having any bearing on the taxonomy of fungi occurring in countries north of the Isthmus of Panama, the scope of the original plan (which was restricted to the region north of Mexico) having been greatly extended, on account of the close connection of species from our southern border with those of Mexico, Central America, and the East Indies. References to works of purely morphological, cytological, and physiological interest have been excluded; so have purely popular accounts, unless they were of use in giving distribution of the species or in furnishing good illustrations. In nomenclature the work is conservative. The principle of adopting the oldest specific name has been generally followed. Where the vagueness of older descriptions has made it uncertain to what species they applied the writers have had no scruples in rejecting the older names.

The index itself is arranged alphabetically. The names are printed in bold-face type, synonyms and cross references being in italics. The citations, arranged in chronological order under each name, follow the form adopted by the Madison Botanical Congress in 1893 and by Section G, A.A.A.S. in 1894. In many cases of confused synonymy, critical examinations were made of authentic specimens and the related literature. Notes of interest obtained thus are added under the species in question. The present part, which is part I of the first volume, includes names from *Abrothallus* to *Badhamia*.—H. HASSELBRING.

⁵ FARLOW, W. G., Bibliographical index of North American fungi. Vol. I, part 1. 8vo. pp. xxxv+312. Washington: Carnegie Institution. 1905.